

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on July 30, 2003, and the references cited therewith.

Claims 1, 18, 108, 252, 261, 270 and 272-274 are amended; as a result, claims 1-52, 108-126, 136-154 and 252-276 are now pending in this application. Applicant does not admit that the cited references are prior art and reserves the right to "swear behind" each of the cited references as provided under 37 C.F.R. 1.131.

Information Disclosure Statement

Applicant submitted a Supplemental Information Disclosure Statement and a 1449 Form on April 9, 2003. Applicant respectfully requests that initialed copies of the 1449 Forms be returned to Applicants' Representatives to indicate that the cited references have been considered by the Examiner.

§102 Rejection of the Claims

Claims 1 and 11 were rejected under 35 USC § 102(e) as being anticipated by Yamamoto et al. (U.S. 6,265,782). Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *In re Dillon* 919 F.2d 688, 16 USPQ2d 1897, 1908 (Fed. Cir. 1990) (en banc), cert. denied, 500 U.S. 904 (1991). Applicant has amended claim 1.

Therefore, among the differences, claim 1, as amended, recites "a material having a Young's modulus of between about .1 megapascals and less than 3 megapascals, at a solder reflow temperature, attaching the die to the substrate." (emphasis added). Applicant respectfully submits that Yamamoto does not disclose a material having a Young's modulus of between about .1 megapascals and less than 3 megapascals. In particular, as set forth in the response (transmitted via facsimile March 27, 2003) to the office action mailed November 27, 2002, multiple citations within Yamamoto teaches away from a die attach material that is less than 3 megapascals.

As previously set forth in the response transmitted via facsimile March 27, 2003, Yamamoto describes "a storage elastic modulus at 260°C of from 3 to 50 MPa . . ." Yamamoto at column 3, lines 33-34. Yamamoto does not disclose or suggest a modification of this material

such that the modulus of the material is in a range of about 0.1 MPa and less than 3 MPa. With regard to ranges, as set forth under MPEP 2144.05,

Applicants can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. . . . A prima facie case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997). MPEP 2144.05.

Applicant respectfully submits that multiple citations within Yamamoto teaches away from a die attach material that is less than 3MPa. For example, Yamamoto teaches that

[t]he adhesive of the present invention must have storage elastic moduli at 25°C of from 20 to 2,000MPa and at 260°C of from 3 to 50 MPa, which are low moduli of elasticity, as measured with a dynamic viscoelastic spectrometer. (emphasis added) Yamamoto at column 14, lines 26-30.

A second citation within Yamamoto also teaches away from a material having a modulus that is not below 3 MPa. In particular, “the comparative example 7” in Table 2 of Yamamoto indicates that the “adhesive film handling properties” are “poor” for a material having a modulus of 1 at 260°C. (See Yamamoto at column 27). With regard to this example, Yamamoto states that

[i]n Comparative Example 7, the epoxy-group-containing acrylic copolymer specified in the present invention is in so large a quantity that the adhesive, though having low and good storage elastic moduli, makes handling properties of the adhesive poor. (emphasis added) Yamamoto at column 27, lines 52-56.

Additionally, a third citation within Yamamoto teaches away from a material having a modulus that is not below 3 MPa. In particular, “the Comparative Example 13” in Table 3 of Yamamoto indicates that both the “electrolytic corrosion resistance” and the “moisture resistance (PCT resistance) are “poor” for a material having a modulus of 2 at 260°C. (See Yamamoto at column 31). With regard to this example, Yamamoto states that

[i]n the Comparative Example 13, the epoxy-group-containing acrylic copolymer specified in the present invention is not contained but the storage elastic modulus at 25°C is adjusted to the one specified in the present invention, showing poor results on electrolytic corrosion resistance and PCT resistance. (emphasis added) Yamamoto at column 31, lines 44-49.

Because Yamamoto teaches away from material having a modulus of less than 3, Applicant respectfully submits that Yamamoto does not teach each element of claim 1. Therefore, Applicant requests withdrawal of the rejection and reconsideration and allowance of claim 1. Because claim 11 depends from and further defines claim 1, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claim 11.

§103 Rejection of the Claims

“To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.” MPEP 2143.

Claims 2, 9, 12, 13, 108, 118, and 120-122

Claims 2, 9, 12, 13, 108, 118, and 120-122 were rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782). With regard to claims 2, 9, 12 and 13, because such claims depend from and further define claim 1, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claim 2, 9, 12 and 13.

With regard to claim 108, among the differences, claim 108, as amended, recites “a material having a Young's modulus of between about .1 megapascals and less than 3 megapascals, at a solder reflow temperature, attaching the die to the substrate.” (emphasis added). Applicant respectfully submits that Yamamoto does not disclose a material having a Young's modulus of between about .1 megapascals and less than 3 megapascals. In particular,

as set forth in the response (transmitted via facsimile March 27, 2003) to the office action mailed November 27, 2002, multiple citations within Yamamoto teaches away from a die attach material that is less than 3 megapascals.

As previously set forth in the response transmitted via facsimile March 27, 2003, Yamamoto describes “a storage elastic modulus at 260°C of from 3 to 50 MPa . . .” Yamamoto at column 3, lines 33-34. Yamamoto does not disclose or suggest a modification of this material such that the modulus of the material is in a range of about 0.1 MPa and less than 3 MPa. With regard to ranges, as set forth under MPEP 2144.05,

Applicants can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. . . . A prima facie case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997). MPEP 2144.05.

Applicant respectfully submits that multiple citations within Yamamoto teaches away from a die attach material that is less than 3MPa. For example, Yamamoto teaches that

[t]he adhesive of the present invention must have storage elastic moduli at 25°C of from 20 to 2,000MPa and at 260°C of from 3 to 50 MPa, which are low moduli of elasticity, as measured with a dynamic viscoelastic spectrometer. (emphasis added) Yamamoto at column 14, lines 26-30.

A second citation within Yamamoto also teaches away from a material having a modulus that is not below 3 MPa. In particular, “the comparative example 7” in Table 2 of Yamamoto indicates that the “adhesive film handing properties” are “poor” for a material having a modulus of 1 at 260°C. (See Yamamoto at column 27). With regard to this example, Yamamoto states that

[i]n Comparative Example 7, the epoxy-group-containing acrylic copolymer specified in the present invention is in so large a quantity that the adhesive, though having low and good storage elastic moduli, makes handling properties of the adhesive poor. (emphasis added) Yamamoto at column 27, lines 52-56.

Additionally, a third citation within Yamamoto teaches away from a material having a modulus that is not below 3 MPa. In particular, “the Comparative Example 13” in Table 3 of Yamamoto indicates that both the “electrolytic corrosion resistance” and the “moisture resistance (PCT resistance) are “poor” for a material having a modulus of 2 at 260°C. (See Yamamoto at column 31). With regard to this example, Yamamoto states that

[i]n the Comparative Example 13, the epoxy-group-containing acrylic copolymer specified in the present invention is not contained but the storage elastic modulus at 25°C is adjusted to the one specified in the present invention, showing poor results on electrolytic corrosion resistance and PCT resistance. (emphasis added) Yamamoto at column 31, lines 44-49.

Because Yamamoto teaches away from material having a modulus of less than 3, Yamamoto does not teach or suggest all of the claim limitations of claim 108. Therefore, Applicant requests withdrawal of the rejection and reconsideration and allowance of claim 108. Because claims 118 and 120-122 depend from and further define claim 108, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claim 118 and 120-122.

Claims 3-6 and 110-114

Claims 3-6 and 110-114 were rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) in view of Yew et al. (U.S. 6,049,129) and Yamagata (U.S. 5,552,637). Because claims 3-6 and 110-114 respectively depend from and further define claims 1 and 108, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 3-6 and 110-114.

Claims 7-8, 10, 14-15, 115-117, 119, and 123-124

Claims 7-8, 10, 14-15, 115-117, 119, and 123-124 were rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) in view of Oxman (U.S. 6,395,124). Because claims 7-8, 10, 14-15 and 115-117, 119, 123-124 respectively depend from

and further define claims 1 and 108, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 7-8, 10, 14-15, 115-117, 119, and 123-124.

Claims 16 and 125

Claims 16 and 125 were rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) in view of Penry (U.S. 6,049,094). Because claims 16 and 125 respectively depend from and further define claims 1 and 108, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 16 and 125.

Claims 17, 35-36, 44, 46-48, 52, 126, 136, 146, 148-150, and 154

Claims 17, 35-36, 44, 46-48, 52, 126, 136, 146, 148-150, and 154 were rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) in view of Narita (U.S. 6,144,107).

Because claims 17 and 126 respectively depend from and further define claims 1 and 108, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 17 and 126.

With regard to claims 35-36, 44, 46-48, 52, 136, 146, 148-150 and 154, Applicant respectfully submits the following remarks. With regard to claims 35 and 136, among the differences, claims 35 and 136 recite a rigid die attach material attaching the die to the substrate.” (emphasis added). The Office Action indicated that “Narita teaches using an IC package having a variety of epoxy resin compositions/formulations including an epoxy resin having a hardening agent, the cured resin being rigid having a Shore D hardness around 85 to improve the moisture and crack resistance (Col. 6, line 64 – Col. 7, line 5; Col. 5-7).” Office Action at ¶ 13, page 11. Additionally, the Office Action indicates that Narita discloses “the die attach material being rigid” in the following statement:

It would have been obvious to a person of ordinary skill in the art at the time [the] invention was made to incorporate the die attach material being rigid as taught by Narita so that the moisture and crack resistance can be improved in Yamamoto et al’s package.” Office Action at ¶ 13, page 11. (emphasis added).

Applicant respectfully traverses the assertion that this citation of Narita discloses a “rigid die attach material.” The adjective “rigid” is used to describe the “solid package 6.” See Narita at column 5, lines 36-38, column 7, lines 10-11. “[T]he solid package 6 is formed (molded) so as to cover the island member 1a, the CCD chip 3 covered with the covering member 5, and the bonding-wires 4 therein by a transfer-molding.” Narita at column 5, lines 31-34. This solid package 6 is used to cover the island member 1a, the CCD chip 3, etc. and is not used to as a die attach material for attaching a die to a substrate.

Therefore, the cited references do not teach or suggest all of the claim limitations of claims 35 and 136. Accordingly, Applicant requests withdrawal of the rejection and reconsideration and allowance of claims 35 and 136. Because claims 35-36, 44, 46-48, 52 and 146, 148-150, 154 respectively depend from and further define claims 35 and 136, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claim 35-36, 44, 46-48, 52 and 146, 148-150, 154.

Claims 18, 26, 28-30, 252, 260, 261, and 263

Claims 18, 26, 28-30, 252, 260, 261, and 263 were rejected under 35 USC § 103(a) as being unpatentable over Yew et al. (U.S. 6,049,129) in view of Yamamoto et al. (U.S. 6,265,782) and Satsu et al. (U.S. 6,225,418). Applicant has amended claim 18, 252 and 261.

Claim 18, as amended, recites “a material having a coefficient of thermal expansion α_2 of less than about 400 (four-hundred) ppm/ $^{\circ}$ C attaching the die to the substrate, wherein the material has a Young’s modulus of between .1 megapascals and less than 3 megapascals, at a solder reflow temperature.” (emphasis added). Claim 252, as amended, recites “a material having a coefficient of thermal expansion α_2 of between about one and about sixty-two ppm/ $^{\circ}$ C attaching the die to the substrate, wherein the material has a Young’s modulus of between .1 megapascals and less than 3 megapascals, at a solder reflow temperature.” (emphasis added). Claim 261, as amended, recites “a material having a coefficient of thermal expansion α_2 of between about 151 (one-hundred and fifty-one) and about 400 (four-hundred)] ppm/ $^{\circ}$ C attaching the die to the substrate, wherein the material has a Young’s modulus of between .1 megapascals and less than 3 megapascals, at a solder reflow temperature.” (emphasis added).

The Office Action indicated that Yamamoto discloses “an integrated circuit (IC)-package having an adhesive material . . . having a Young’s modulus (YM) of about 3 megapascals (Mpa)” See Office Action at ¶14. Applicant respectfully submits that Yamamoto does not disclose a material having a Young’s modulus of between about .1 megapascals and less than 3 megapascals. In particular, as set forth in the response (transmitted via facsimile March 27, 2003) to the office action mailed November 27, 2002, multiple citations within Yamamoto teaches away from a die attach material that is less than 3 megapascals.

As previously set forth in the response transmitted via facsimile March 27, 2003, Yamamoto describes “a storage elastic modulus at 260°C of from 3 to 50 MPa . . .” Yamamoto at column 3, lines 33-34. Yamamoto does not disclose or suggest a modification of this material such that the modulus of the material is in a range of about 0.1 MPa and less than 3 MPa. With regard to ranges, as set forth under MPEP 2144.05,

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[t]he adhesive of the present invention must have storage elastic moduli at 25°C of from 20 to 2,000MPa and at 260°C of from 3 to 50 MPa, which are low moduli of elasticity, as measured with a dynamic viscoelastic spectrometer. (emphasis added) Yamamoto at column 14, lines 26-30.

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[i]n Comparative Example 7, the epoxy-group-containing acrylic copolymer specified in the present invention is in so large a quantity that the adhesive, though having low and good storage elastic moduli, makes handling properties of the adhesive poor. (emphasis added) Yamamoto at column 27, lines 52-56.

Additionally, a third citation within Yamamoto teaches away from a material having a modulus that is not below 3 MPa. In particular, “the Comparative Example 13” in Table 3 of Yamamoto indicates that both the “electrolytic corrosion resistance” and the “moisture resistance (PCT resistance) are “poor” for a material having a modulus of 2 at 260°C. (See Yamamoto at column 31). With regard to this example, Yamamoto states that

[i]n the Comparative Example 13, the epoxy-group-containing acrylic copolymer specified in the present invention is not contained but the storage elastic modulus at 25°C is adjusted to the one specified in the present invention, showing poor results on electrolytic corrosion resistance and PCT resistance. (emphasis added) Yamamoto at column 31, lines 44-49.

Because Yamamoto teaches away from material having a modulus of less than 3, Yamamoto does not teach or suggest all of the claim limitations of claim 18, 252 and 261. Therefore, Applicant requests withdrawal of the rejection and reconsideration and allowance of claims 18, 252 and 261. Because claims 26, 28-30; 260 and 261, 263 respectively depend from and further define claims 18, 252 and 261, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 26, 28-30; 260 and 261, 263.

Claim 109

Claim 109 was rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) in view of Kunitomo et al. (U.S. 5,550,408). Because claim 109 depends from and further defines claim 108, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 109.

Claims 19 and 253

Claims 19 and 253 were rejected under 35 USC § 103(a) as being unpatentable over Yew et al. (U.S. 6,049,129), Yamamoto et al. (U.S. 6,265,782) and Satsu et al. (U.S. 6,225,418) as applied to claims 18 and 252 above, and further in view of APA. Because claims 19 and 253 respectively depend from and further define claims 18 and 252, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 19 and 253.

Claims 20-23 and 254-257

Claims 20-23 and 254-257 were rejected under 35 USC § 103(a) as being unpatentable over Yew et al. (U.S. 6,049,129), Yamamoto et al. (U.S. 6,265,782) and Satsu et al. (U.S. 6,225,418) as applied to claims 18 and 252 above, and further Yamagata (U.S. 5,552,637). Because claims 20-23 and 254-257 respectively depend from and further define claims 18 and 252, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 20-23 and 254-257.

Claims 24, 25, 27, 31, 32, 258, 259, and 262, 264-267

Claims 24, 25, 27, 31, 32, 258, 259, and 262, 264-267 were rejected under 35 USC § 103(a) as being unpatentable over Yew et al. (U.S. 6,049,129), Yamamoto et al. (U.S. 6,265,782) and Satsu et al. (U.S. 6,225,418) as applied to claims 18, 252, and 261 above, and further in view of Oxman et al. (U.S. 6,395,124). Because claims 24-25, 27, 31-32; 258-259; and 262, 264-267 respectively depend from and further define claims 18, 252 and 261, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 24-25, 27, 31-32; 258-259; and 262, 264-267.

Claims 33 and 268

Claims 33 and 268 were rejected under 35 USC § 103(a) as being unpatentable over Yew et al. (U.S. 6,049,129), Yamamoto et al. (U.S. 6,265,782) and Satsu et al. (U.S. 6,225,418) as applied to claims 18 and 261 respectively above, and further in view of Penry (U.S. 6,049,094). Because claims 33 and 268 respectively depend from and further define claims 18 and 261,

Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 33 and 268.

Claims 34 and 269

Claims 34 and 269 were rejected under 35 USC § 103(a) as being unpatentable over Yew et al. (U.S. 6,049,129), Yamamoto et al. (U.S. 6,265,782) and Satsu et al. (U.S. 6,225,418) as applied to claims 18 and 261 respectively above, and further in view of Narita (U.S. 6,144,107). Because claims 34 and 269 respectively depend from and further define claims 18 and 261, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 34 and 269.

Claims 37-41 and 139-142

Claims 37-41 and 139-142 were rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) and Narita (U.S. 6,144,107) as applied to claims 35 and 136 respectively above, and further in view of Yew et al. (U.S. 6,049,129) and Yamagata (U.S. 5,552,637). Because claims 37-41 and 139-142 respectively depend from and further define claims 35 and 136, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 37-41 and 139-142.

Claims 42-43, 45, 49, 50, 143, 144, 145, 147, 151, and 152

Claims 42-43, 45, 49, 50, 143, 144, 145, 147, 151, and 152 were rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) and Narita (U.S. 6,144,107) as applied to claims 35 and 136 above, and further in view of Oxman et al. (U.S. 6,395,124). Because claims 42-43, 45, 49, 50 and 143, 144, 145, 147, 151, 152 respectively depend from and further define claims 35 and 136, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 42-43, 45, 49, 50 and 143, 144, 145, 147, 151, 152.

Claims 51 and 153

Claims 51 and 153 were rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) and Narita (U.S. 6,144,107) as applied to claims 35 and 136

respectively above, and further in view of Penry (U.S. 6,049,094). Because claims 51 and 153 respectively depend from and further define claims 35 and 136, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 51 and 153.

Claim 137

Claim 137 was rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) and Narita (U.S. 6,144,107) as applied to claim 136 respectively above, and further in view of Kunitomo et al. (U.S. 5,550,408). Because claim 137 depends from and further defines claim 136, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claim 137.

Claim 138

Claim 138 was rejected under 35 USC § 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,265,782) and Narita (U.S. 6,144,107) as applied to claim 136 respectively above, and further in APA. Because claim 138 depends from and further defines claim 136, Applicant respectfully requests withdrawal of the rejection and reconsideration and allowance of claim 138.

Allowable Subject Matter

Claim 270 was indicated to be allowable if rewritten to overcome the objection(s) set forth in the Office Action. In particular the Office Action objected to claim 270 because such claim "should include descriptions/definitions of R_1 , R_2 , n and R_3 ." Office Action at ¶4. Applicant has so amended claim 270. Accordingly, Applicant requests withdrawal of the objection and reconsideration and allowance of claim 270.

Claims 271-275 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant has so amended claims 272-274. Additionally, in light of the amendment to claim 270, Applicant respectfully submits that claims 271 and 275-275 are now in condition for allowance. Accordingly, Applicant requests withdrawal of the rejection and reconsideration and allowance of claims 271-276.

Additionally, the Office Action includes a statement of reasons for the indication of allowable subject matter. See Office Action at ¶29. The Statement uses the term "prior art." However, Applicant does not make any admissions regarding the prior-art status of any references in the record of the application. Instead, Applicant regards these references as only being "of record."

Additionally, Applicant submits that the Statement makes numerous assertions regarding the interpretations of limitations of the claims, the contents of the art and distinguishing features of the claims. Applicant has neither verified nor accepted the accuracy of these assertions, and respectfully submits that there may be different interpretations than those identified in the Statement. Additionally, Applicant respectfully submits that the relevant claims may be allowable for one or more reasons in addition to and/or in alternative to those reasons identified in the Statement. Applicant reserves the right to further address one or more aspects of the Statement as may later be necessary or desirable.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612-371-2103) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743

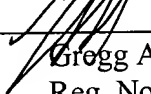
Respectfully submitted,

TONGBI JIANG ET AL.

By their Representatives,

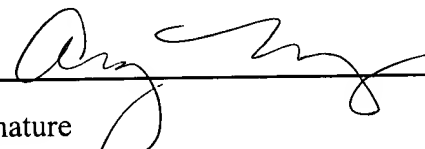
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By 
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 1st day of December, 2003.

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